

## SEQUENCE LISTING

```
Corona Villegas, Miguel
       Garcia Rodriguez, Ma Consuelo
      Valdez Cruz, Norma Adriana
       Gurrola Briones, Georgina
       Becerril Lujan, Baltazar
       Possani Postay, Lourival Domingos
<120> Recombinant Immunogens for the Generation of Antivenoms to the
       Venom of Scorpions of the Genus Centruroides
<130> 2399.0070001/JAG/LAV
<140> 10/721,793
<141> 2003-11-26
<150> US 60/430,067
<151> 2002-12-02
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Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
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ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
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aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc
                                                                     144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca
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Cys
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                    -15
aca gtg tgg gca aag gaa ggt tat ctg gta agc aag agc acg ggc tgc
                                                                      96
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys
            -1 1
aaa tac gag tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa
                                                                      144
Lys Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu
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                            20
tgc aaa gcg ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc
                                                                      192
Cys Lys Ala Pro Asn Gln Gly Gly Gly Tyr Gly Tyr Cys His Ala Phe
    30
gca tgc tgg tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att
                                                                      240
Ala Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile
45
cct ggt aaa tca tgc ggc aaa aaa taatgaaaac gactttttat tgtccaccaa
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Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys
                        20
Lys Ala Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala
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Gly Lys Ser Cys Gly Lys Lys
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                                                                      96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc
                                                                     144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca
                                                                     192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
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Cys
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                                 25
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Cys
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					gac Asp											144
_	_				ggt Gly											192
					ccc Pro 50											240
		tgt Cys	_		taat	ggca	ac t	tgtt	ttta	it t <u>s</u>	gtgca	accaa	a cag	gaaat	att	295
gtaa	cgct	tc t	taat	tgc												313
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Val	Trn															
	iip	-1	Asn 1	Asp	Gly	Tyr	Leu 5	Phe	Asp	Lys	Arg	Lys 10	Arg	Cys	Thr	
Leu	_	-1	1	_	Gly Lys	-	5					10		_		
	Glu 15	-1 Cys	1 Ile	Asp	_	Thr 20	5 Gly	Asp	Lys	Asn	Cys 25	10 Asp	Arg	Asn	Cys	

Thr Cys Arg Lys 65

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ata gac aag aca gga gac aaa aat tgc gat aga aat tgc aag aag gaa
                                                                      96
Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Lys Glu
gga ggt agt ttt ggc aaa tgc tct tat tct gca tgc tgg tgc aaa gga
                                                                     144
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Ser Ala Cys Trp Cys Lys Gly
ttg ccc gga att aca ccg att tca cgt act cct ggt aaa aca tgt
                                                                     189
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys
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Ala Thr Gly Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Ile Ile Lys
        -5
                       -1 1
acg ggc tgc aaa tac aat tgc tat ata ttg gga aaa aac aaa tac tgc
                                                                       96
Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
                    15
aat tcg gaa tgc aaa gag gta ggt gct ggt tac ggc tat tgc tat gct
                                                                       144
Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
                                                                       192
ttt ggg tgc tgg tgc gaa gga tta ccc gaa agt ata ccg acc tgg ccc
Phe Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Ile Pro Thr Trp Pro
            45
ctt cct gat aaa aca tgt ggc aca aaa taatggcaac gtctttttat
                                                                       239
Leu Pro Asp Lys Thr Cys Gly Thr Lys
        60
tgtccaccaa cagaaatatt gtaacgcttc ttaa
                                                                       273
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                        -1 1
Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
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Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
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                                                                      48
Lys Asp Gly Tyr Leu Val Ile Ile Lys Thr Gly Cys Lys Tyr Asn Cys
                                    10
tat ata ttg gga aaa aac aaa tac tgc aat tcg gaa tgc aaa gag gta
                                                                      96
Tyr Ile Leu Gly Lys Asn Lys Tyr Cys Asn Ser Glu Cys Lys Glu Val
            20
                                25
ggt gct ggt tac ggc tat tgc tat gct ttt ggg tgc tgg tgc gaa gga
                                                                     144
Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Glu Gly
                            40
tta ccc gaa agt ata ccg acc tgg ccc ctt cct gat aaa aca tgt ggc
                                                                     192
Leu Pro Glu Ser Ile Pro Thr Trp Pro Leu Pro Asp Lys Thr Cys Gly
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aca aaa
Thr Lys
65
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       16
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       66
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Tyr Ile Leu Gly Lys Asn Lys Tyr Cys Asn Ser Glu Cys Lys Glu Val

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30

192

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tgc gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa

Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys 50 55 tca tgc ggc aga aaa taatggcaaa gactttttat tgtccatcaa cagaaatatt 247 Ser Cys Gly Arg Lys 65 gtaacgcttc ttaa 261 <210> 18 <211> 69 <212> PRT <213> Centruroides exilicauda <400> 18 Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser Cys Gly Arg Lys 65 <210> 19 <211> 195 <212> DNA <213> Centruroides exilicauda <220> <221> CDS <222> (1)..(195) <223> Product = Sodium channel modifier toxin In the mature peptide, the last Cys is amidated, and the last Gly and the last 2 basic aminoacids are cut <400> 19 aag gat ggt tat ctg gta aac aag agc acg ggc tgc aaa tac gag tgc 48 Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag 96 Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys

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aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc
                                                                      144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
                            40
gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa tca
                                                                      192
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
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Cys
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Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
            20
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
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Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
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                -15
                                     -10
gtg tgg gca aag gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa
                                                                       96
Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
        -1 1
tac gag tgc ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc
                                                                      144
Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys
    15
                        20
aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca
                                                                      192
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
                    35
                                         40
                                                             45
30
tgc tgg tgc gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct
                                                                      240
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro
                50
                                     55
                                                         60
aat aaa tca tgc ggc aga aaa taatggcaaa gactttttat tgtccatcaa
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Asn Lys Ser Cys Gly Arg Lys
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cagaaatatt gtaacgcttc tta
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Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
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Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala 30 35 40 45	
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro 50 55 60	
Asn Lys Ser Cys Gly Arg Lys 65	
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ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys 20 25 30	96
aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys 35 40 45	144
gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa tca Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser 50 55 60	192
tgc Cys 65	195
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Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys 1 5 10 15	

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            2.0
                                                    3.0
                                25
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
                          40
        35
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
Cys
65
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Ala Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
                                        10
tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg
                                                                      96
Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg
                                                                     144
Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
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35 40 45 tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa 192 Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys 55 tca tgc ggc aaa aaa taatgaaaac gactttttat tgtcctccaa cagaaatatt 247 Ser Cys Gly Lys Lys 261 gtaacgcttc ttaa <210> 26 <211> 69 <212> PRT <213> Centruroides exilicauda <400> 26 Ala Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu 5 Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala 20 25 Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser Cys Gly Lys Lys 65 <210> 27 <211> 195 <212> DNA <213> Centruroides exilicauda <220> <221> CDS (1)..(195) <222> <223> Product= Sodium channel modifier toxin <400> 27 aag gac ggt tat ctg gta agc aag agc acg ggc tgc aaa tac gag tgc 48 Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg 96 Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro

25

20

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aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc
                                                                     144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
       35
                            40
gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca
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Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
tgc
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Cys
65
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Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
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Cys
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<400	)>	29														
_		gaa Glu														48
_		tgg Trp	_				_		-	_	_	_	_			96
_		caa Gln														144
_	_	ggt Gly 50	_		_	_		_								192
		ggc Gly			taat	ggca	aaa g	gactt	ttta	at to	gtcca	atcaa	a cag	gaaat	tatt	247
gtaa	acgo	ttc t	ttaa													261
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Сув	Phe	e Trp	Leu	Gly 20	Lys	Asn	Glu	Phe	Cys 25	Asp	Lys	Glu	Cys	Lys 30	Ala	
Lys	Asr	ı Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Сув	Tyr	Ser	Phe	Ala 45	Cys	Trp	
Cys	Glu	Gly	Leu	Pro	Glu	Ser	Thr 55	Ser	Thr	Tyr	Pro	Leu 60	Pro	Asn	Lys	

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Ser Cys Gly Arg Lys
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Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag
                                                                        96
Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
            20
aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc
                                                                       144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
                             40
qaa qqt ttq ccc qaa agt aca tcg act tat cct ctt cct aat aaa tca
                                                                       192
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
                                                                       195
tgc
Cys
65
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<400> 32
Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
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Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
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Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
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Cys
65
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       In the mature peptide, the last Cys is amidated, and the last Gly
       and the last 2 basic aminoacids are cut
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                                                                      48
Ala Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg
                                                                      96
Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg
                                                                     144
Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa
                                                                     192
Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
tca tgc ggc aaa aaa taatggcaaa gactttttat tgtccatcaa cagaaatatt
                                                                     247
Ser Cys Gly Lys Lys
    65
                                                                     261
gtaacgcttc ttaa
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<213> Centruroides exilicauda
<400> 34
Ala Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
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                                                            15
Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
                                    25
Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
                                40
Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
                           55
Ser Cys Gly Lys Lys
   65
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                                                                      48
Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg
                                                                      96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
            20
aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc
                                                                     144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca
                                                                     192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
                        55
                                                                     195
tgc
Cys
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<210> 36
<211> 65
<212> PRT
<213> Centruroides exilicauda
<400> 36
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Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
                            40
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
                        55
Cys
65
<210> 37
<211> 254
<212> DNA
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<220>
<221> CDS
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        and the last 2 basic aminoacids are cut
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<222>
       (205)..(254)
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<220>
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<222> (1)..(3)
<223> Carboxy end of the signal peptide
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<221> mat_peptide
<222>
      (4)..()
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<400> 37
gca aag gaa ggt tat ctg gtg aac ata tac acg ggc tgc aaa tac agt
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Ala Lys Glu G	Hly Tyr Leu 5	Val Asn	Ile Tyr	Thr Gly (	Cys Lys	Tyr Ser 15	
tgc tgg ttg t Cys Trp Leu L							96
ata gga gct g Ile Gly Ala G 3		Tyr Cys I					144
caa ttt cca g Gln Phe Pro G 50				Tyr Pro			192
ggc aga aaa t Gly Arg Lys 65	taagtaacgt (	ctttttatt	g tetgeg	gcaaa aga	attattg		241
taacgcttct ta	aa						254
<210> 38 <211> 67 <212> PRT <213> Centru	ıroides exi	licauda					,
<400> 38							
Ala Lys Glu G -1 1	Gly Tyr Leu 5	Val Asn	Ile Tyr	Thr Gly	Cys Lys	Tyr Ser 15	
Cys Trp Leu I	Leu Gly Glu 20	Asn Glu	Tyr Cys 25	Ile Ala	Glu Cys	Lys Glu 30	
Ile Gly Ala G	Gly Tyr Gly 35		His Gly 40	Phe Gly	Cys Trp 45	Cys Glu	
Gln Phe Pro G	Glu Asn Lys	Pro Ser 55	Tyr Pro		Glu Lys 60	Ser Cys	
Gly Arg Lys 65							
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                                    10
tgg ttg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag ata
                                                                      96
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
            20
                                25
gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa caa
                                                                     144
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc
                                                                     189
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
                        55
<210> 40
<211> 63
<212> PRT
<213> Centruroides exilicauda
<400> 40
Lys Glu Gly Tyr Leu Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
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                                    10
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
                                25
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
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      (1)..(204)
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<223>
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        and the last 2 basic aminoacids are cut
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aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His 20 25 30	96
cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu 35 40 45	144
gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys 50 55 60	192
ggc aaa aaa taa tggcaacgct gttctattgg ccaccaacgg aaatatttaa Gly Lys Lys 65	244
cgcttcttaa	254
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Lys Asp Gly Tyr Pro Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr 1 5 10 15	
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His 20 25 30	
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu 35 40 45	
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys 50 55 60	
Gly Lys Lys 65	
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                5
                                                                      96
aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa
                                                                     144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
                                                                     192
qqa ttq qcc qaa aqt aca ccq act tgg ccc ctt cct aat aaa tca tgc
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
<210> 44
<211> 64
<212> PRT
<213> Centruroides exilicauda
<400> 44
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Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
            20
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
        35
                            40
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
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<210> 45
<211> 258
<212> DNA
<213> Centruroides exilicauda
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<221> CDS
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      (1)..(204)
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       In the mature peptide, the last Cys is amidated, and the last Gly
        and the last 2 basic aminoacids are cut
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	_	gga Gly	_				_			_	_		_	_		96
_		ggt Gly 35	_				_					_		_	_	144
		gcc Ala														192
		aaa Lys	taa	tgg	caac	gct g	gttci	tatto	gg co	cacca	aacg	g aaa	atati	taa		244
cgc	ttct	taa 1	ttgc													258
<210 <210 <210 <210	1 > 2 >	46 67 PRT Cent:	ruro	ides	exi:	lica	ıda									
<40	0 >	46														
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Lys	Leu	Gly	Glu 20	Asn	Lys	Phe	Cys	Asn 25	Arg	Glu	Cys	Lys	Met 30	Lys	His	
Arg	Gly	Gly 35	Ser	Tyr	Gly	Tyr	Cys 40	Tyr	Phe	Phe	Gly	Cys 45	Tyr	Cys	Glu	
Gly	Leu 50	Ala	Glu	Ser	Thr	Pro 55	Thr	Trp	Pro	Leu	Pro 60	Asn	Lys	Ser	Суз	
Gly 65	Lys	Lys														
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      (1)..(192)
<222>
<223> Product= Sodium channel modifier toxin
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Lys Asp Gly Tyr Leu Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
                                    10
aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac
                                                                      96
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa
                                                                     144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
                            40
                                                                     192
gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
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                                            60
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Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
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Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
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<221>
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       Product = Sodium channel modifier toxin precursor
       In the mature peptide, the last Cys is amidated, and the last Gly
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and the last 2 basic aminoacids are cut

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	_	ttg Leu				_										96
	_	ggt Gly 35				_										144
		gaa Glu														192
aga Arg 65		taa	tago	caaco	gtc t	tttt	atto	gt ct	gcca	aaag	g aat	tatt	gta			241
acgo	ttc	tta a	ì													252
<210 <211 <212 <213	L> ( 2> ]	50 66 PRT Centi	ruroi	ides	exi	licau	ıda									
<400	)>!	50														
Lys 1	Glu	Gly	Tyr	Pro 5	Val	Asn	Ile	Tyr	Thr 10	Gly	Cys	Lys	Tyr	Ser 15	Cys	
Trp		Leu												Glu	Ile	
Gly	Ala	Gly 35	Tyr	Gly	Tyr	Cys	His 40	Gly	Phe	Gly	Cys	Trp 45	Cys	Glu	Gln	
Phe	Pro 50	Glu	Asn	Lys	Pro	Ser 55	Tyr	Pro	Tyr	Pro	Glu 60	Lys	Ser	Cys	Gly	
Arg	Lys															

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<220>
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                                                                     48
Lys Glu Gly Tyr Pro Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
tgg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag ata
                                                                     96
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
           20
gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa caa
                                                                     144
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc
                                                                     189
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
<210> 52
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<213> Centruroides exilicauda
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                                    10
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                                25
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
        35
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
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<211> 322
<212> DNA
<213> Centruroides limpidus limpidus
<220>
<221> CDS
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<222> (5)..(265)

<223> Product= Sodium channel modifier toxin precursor

In the mature peptide, the last Asn is amidated, and the last Gl y and the last basic aminoacid are cut <220> <221> mat\_peptide <222> (62)..()
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<212> PRT

<213> Centruroides limpidus limpidus

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Val Trp Ala -1	Lys Glu Gly	Tyr Leu Val 5	Asn His Ser	Thr Gly Cys 10	Lys
Tyr Glu Cys 15	Tyr Lys Let	Gly Asp Asn 20	Asp Tyr Cys :	Leu Arg Glu	Cys
Lys Gln Gln 30	Tyr Gly Lys	Gly Ala Gly	Gly Tyr Cys	Tyr Ala Phe	Gly 45
Cys Trp Cys	Thr His Leu 50	ı Tyr Glu Gln	Ala Val Val	Trp Pro Leu 60	Pro
Lys Lys Thr	Cys Asn Gly 65	. Lys			
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	. (198)				
<223> Produ	uct= Sodium	channel modi	fier toxin Cl	14	
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			cta agg gaa Leu Arg Glu		
			tac gct ttt Tyr Ala Phe		_

tgc aac Cys Asn 65

192

aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt cct aag aaa aca Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Thr

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<213> Centruroides limpidus limpidus
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Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Gln Gln
Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Thr
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Cys Asn
65
<210> 57
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<212> DNA
<213> Centruroides limpidus limpidus
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       y and the last basic aminoacid are cut
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					gaa Glu											97
					aaa Lys											145
_			_		tac Tyr			_				_		_		193
	_		_		cat His 50			_				_				241
				_	tac Tyr			taat	ggca	ac g	gactt	ttta	it to	gteca	accaa	295
caga	aata	att g	gtaac	gctt	c tt	aatt	g									322
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Tyr	Ala 15	Cys	Leu	Lys	Leu	Gly 20	Glu	Asn	Asp	Tyr	Cys 25	Leu	Arg	Glu	Cys	
Lys 30	Ala	Arg	Tyr	Tyr	Lys 35	Ser	Ala	Gly	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Ala 45	
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                                                                      96
Leu Lys Leu Gly Glu Asn Asp Tyr Cys Leu Arg Glu Cys Lys Ala Arg
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Tyr Tyr Lys Ser Ala Gly Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
        35
                            40
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Cys Tyr

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                                           -10
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                                                                          97
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aaa tac gaa tgc tat aaa ttg gga gac aac gat tat tgc tta agg gaa
                                                                         145
Lys Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
        15
                                                                         193
tgc aaa ttg aga tac gga aaa ggt gct ggc ggc tat tgc tac gct ttt
Cys Lys Leu Arg Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe
    30
ggg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt
                                                                         241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
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                     50
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cca aag aaa aga tgc aat gga aaa taatggcaac gactttttat tgtccaccaa
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(1)..(198)

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		ggt Gly 15	_							_		_	_	_	_	145
_		gcg Ala				-										193
		tgg Trp														241
		aaa Lys	_	_	_			taat	ggca	ac c	gtctt	ttta	at to	gtcca	accaa	295
caga	aaata	att g	gtaad	cgctt	c tt	aatt	g									322
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Tyr	Gly 15	Cys	Phe	Trp	Leu	Gly 20	Lys	Asn	Glu	Asn	Cys 25	Asp	Lys	Glu	Cys	

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aca gtg tgg gca aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc
                                                                      97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
aaa tac ggt tgc ttc tgg ttg gga aaa aac gaa aac tgc gat atg gaa
                                                                     145
Lys Tyr Gly Cys Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu
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		gcg Ala														193
		tgg Trp														241
		aaa Lys						taat	ggca	aac g	gtctt	ttta	at t <u>e</u>	gtcca	accaa	295
caga	aaat	att g	gtaad	cgctt	c tt	aatt	g									322
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Val	Trp	Ala -1	_	Glu	Gly	Tyr	Leu 5	Val	Asn	Lys	Ser	Thr 10	Gly	Cys	Lys	
Tyr	Gly 15	Cys	Phe	Trp	Leu	Gly 20	Lys	Asn	Glu	Asn	Cys 25	Asp	Met	Glu	Cys	
Lys 30	Ala	Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Ser	Phe	Ala 45	
Cys	Trp	Cys	Glu	Gly 50	Leu	Pro	Asp	Ser	Thr 55	Pro	Thr	Tyr	Pro	Leu 60	Pro	
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Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu Cys Lys Ala Lys
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Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
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gaa ggt ttg ccc gat agt aca ccg act tat ccc ctt cct aat aaa tcg
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Cys Ser
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                                         -10
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Thr Val Trp Thr Lys Glu Gly Tyr Leu Val Asn Met Lys Thr Gly Cys
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aaa tac ggg tgc tat gaa ttg ggt gac aac ggt tac tgc gat agg aaa
                                                                     145
Lys Tyr Gly Cys Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys
        15
                            20
tgc aaa gcg gag agc ggt aac tac ggc tat tgc tat act gtt ggg tgc
                                                                     193
Cys Lys Ala Glu Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys
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tgg tgc gaa gga ttg ccc aat agt aaa ccg act tgg ccc ctt cct ggt
                                                                     241
Trp Cys Glu Gly Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly
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aaa tca tgc agc gga aaa taatagcaac gtctttttat tgtccaccaa
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Lys Ser Cys Ser Gly Lys
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1

5

15

145

Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys Cys Lys Ala Glu 20 Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys Trp Cys Glu Gly 40 Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly Lys Ser Cys Ser <210> 77 <211> 316 <212> DNA <213> Centruroides limpidus limpidus <220> <221> CDS <222> (5)..(259) <223> Product= Sodium channel modifier toxin precursor In the mature peptide, the last Cys is amidated, and the last Gly and the last 2 basic aminoacids are cut <220> <221> 3'UTR <222> (263)..(316) <223> 3'UTR <220> <221> 5'UTR <222> (1)..(4) <223> 5'UTR <220> <221> mat\_peptide <222> (62)..() <223> Product= Sodium channel modifier toxin <220> <221> sig\_peptide (5)..(61) <223> sig\_peptide <400> 77 gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc cta ttc gga 49 Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly -15 -5 aca gtg tgg gca aag gaa ggt tat ctg gtg aac acg tac acg ggc tgc 97 Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Thr Tyr Thr Gly Cys -1 1

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Lys Ty	r Ile 15	Сув	Trp	Lys	Leu	Gly 20	Glu	Asn	Lys	Tyr	Cys 25	Ile	Asp	Glu	
tgt aa Cys Ly 30															193
tat tg Tyr Cy 45															241
aaa ac Lys Th					taat	tgaca	aac 🤉	gtcti	tttt	at to	gtcca	accaa	a		289
cagaaa	tatt	gtaa	cgct	tc ti	taati	tg									316
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Tyr Il 15	e Cys	Trp	Lys	Leu	Gly 20	Glu	Asn	Lys	Tyr	Cys 25	Ile	Asp	Glu	Cys	
Lys Gl 30	u Ile	Gly	Ala	Gly 35	Tyr	Gly	Tyr	Cys	Tyr 40	Gly	Phe	Gly	Cys	Tyr 45	
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                                                                       96
Trp Lys Leu Gly Glu Asn Lys Tyr Cys Ile Asp Glu Cys Lys Glu Ile
                                25
gga gct ggt tac ggc tat tgc tac ggt ttt ggg tgc tat tgc gaa gga
                                                                      144
Gly Ala Gly Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu Gly
ttt ccc gaa aat aaa ccg acc tgg ccc ctt cct aat aaa aca tgc
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gag tg Glu Cy 45															193
cct aa Pro As							taat	ggca	aac <u>c</u>	gtett	ttta	at to	gtcca	accaa	247
cagaaa	tatt g	gtaad	gctt	c tt	aatt	g									274
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Lys Ty	r Glu 15	Cys	Phe	Lys	Leu	Gly 20	Glu	Asn	Glu	His	Cys 25	Asp	Thr	Glu	
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		ttg Leu		_		_		_	_	_	_	_			_	90	5
aac Asn		gga Gly 35														144	4
Glu		ttg Leu														19:	2
tgc Cys 65																19!	5
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Phe	Lys	Leu	Gly 20	Glu	Asn	Glu	His	Cys 25	Asp	Thr	Glu	Cys	Lys 30	Ala	Pro		
Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Asp	Thr	Phe	Glu 45	Cys	Trp	Cys		
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                                                                       97
Thr Val Trp Ser Lys Glu Gly Tyr Ile Val Asn Ser Tyr Thr Gly Cys
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aaa tac gaa tgc ttg aaa ttg gga gac aac gat tat tgc ttg agg gaa
                                                                      145
Lys Tyr Glu Cys Leu Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
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tgc aaa cag cag tac gga aaa ggt gct ggc ggc tat tgt tac gct ttt
                                                                      193
Cys Lys Gln Gln Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe
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Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
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Tyr	Glu 15	Cys	Leu	Lys	Leu	Gly 20	Asp	Asn	Asp	Tyr	Сув 25	Leu	Arg	Glu	Cys	
Lys 30	Gln	Gln	Tyr	Gly	Lys 35	Gly	Ala	Gly	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Gly 45	
Cys	Trp	Cys	Thr	His 50	Leu	Tyr	Glu	Gln	Ala 55	Val	Val	Trp	Pro	Leu 60	Lys	
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tgc aac
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Cys Asn
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		aac Asn 15	_	_		_		_				_	_	_	_	145
		gcg Ala														193
	_	tat Tyr	_	_		_		_	_		_					241
		aaa Lys		_	_			taat	ggca	ac <u>c</u>	gactt	ttta	at t <u>e</u>	gtcca	accaa	295
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Tyr Asn Cys Leu Ile Leu Gly Glu Asn Lys Asn Cys Asp Met Glu Cys

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aca gtg tgg gca aag gaa ggt tat att gta aac tac cac gat ggc tgc
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		ttg Leu														193
		tgg Trp														241
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Val	Trp	Ala -1	Lys 1	Glu	Gly	Tyr	Ile 5	Val	Asn	Tyr	His	Asp 10	Gly	Cys	Lys	
Tyr	Glu 15	Cys	Tyr	Lys	Leu	Gly 20	Asp	Asn	Asp	Tyr	Cys 25	Leu	Arg	Glu	Cys	
Lys 30	Leu	Arg	Tyr	Gly	Lys 35	Gly	Ala	Gly	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Gly 45	
Cys	Trp	Cys	Thr	His 50	Leu	Tyr	Glu	Gln	Ala 55	Val	Val	Trp	Pro	Leu 60	Pro	
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		20					25					30			
Tyr Gl		20	_	Gly	Gly	Tyr 40		Tyr	Ala	Phe	Gly 45		Trp	Cys	
	y Lys 35	20 Gly	Ala			40	Cys				45	Cys			
Tyr Gl	y Lys 35 s Leu	20 Gly	Ala		Ala	40	Cys			Leu	45	Cys			
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Tyr	Gly 15	Cys	Leu	Leu	Leu	Arg 20	Lys	Asn	Glu	Gly	Cys 25	Asp	Lys	Glu	Cys		
Lys 30	Ala	Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Ser	Phe	Ala 45		
Cys	Trp	Cys	Glu	Gly 50	Leu	Pro	Glu	Ser	Thr 55	Pro	Thr	Tyr	Pro	Leu 60	Pro		
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gaas						Met					Leu				Gly -5	47
	gtg Val	_	_	_	_			_	_		_	_	_		_	97
	tac Tyr															145
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	tgc Cys		_													241
	ggt Gly			_		_		taad	eggca	aac g	gatat	ttta	at to	gttta	accaa	295
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Tyr	Ser 15	Cys	Val	Leu	Leu	Gly 20	Lys	Asn	Glu	Asn	Cys 25	Asp	Lys	Glu	Cys	
Lys 30	Ala	Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Gly 45	
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Val Leu Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys Lys Ala Lys
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aac caa gga ggt agt tac ggc tat tgc tac gct ttt ggg tgc tgg tgt
                                                                     144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
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                                                                       97
Thr Val Cys Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
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aaa tac agt tgc ggg aaa ttg gga gaa aac gaa cac tgc gat aag gaa
                                                                      145
Lys Tyr Ser Cys Gly Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu
tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tat gct ttt
                                                                      193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
                        35
ggg tgc tgg tgt gaa gga ttg ccc gaa agt acc ccg act tat ccc att
                                                                      241
Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile
cct ggt aaa tca tgc ggc aga aaa taacggcaac gatattttat tgtttaccaa
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Pro Gly Lys Ser Cys Gly Arg Lys
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Tyr Ser Cys Gly Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu Cys 15 20 25	
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly 30 35 40 45	
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aac caa gga ggt agt tac ggc tat tgc tat gct ttt ggg tgc tgg tgt Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys 35 40 45	144

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Cys
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					gac Asp											97
		_			ttg Leu		-				_		_	_	_	145
		_		-	ggt Gly											193
					gaa Glu 50											241
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Asn	Cys 15	Trp	Ile	Leu	Gly	Glu 20	Asn	Lys	Tyr	Cys	Asn 25	Ser	Glu	Cys	Lys	

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Cys Thr Trp Lys His Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe
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Tyr	Thr	Cys 15	Trp	Ile	Leu	Gly	Glu 20	Asn	Lys	Tyr	Cys	Asn 25	Arg	Glu	Cys	
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Tyr	Thr	Cys 15	Trp	Ile	Leu	Gly	Glu 20	Asn	Lys	Tyr	Cys	Asn 25	Arg	Glu	Cys	
Thr	Trp 30	Lys	His	Arg	Gly	Gly 35	Asn	Tyr	Gly	Tyr	Cys 40	Tyr	Gly	Phe	Gly	
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Thr Val Trp Ala Lys Asp Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
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Cys Lys Ala Pro Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu
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туr	Gly 15	Cys	Met	Leu	Lys	Ile 20	Gly	Asp	Ala	Gly	Cys 25	Asp	Lys	Glu	Cys	
Lys 30	Ala	Pro	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Leu	Leu	Gly 45	

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Met Leu Lys Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys Lys Ala Pro
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gaa ggt atg cct gaa agt aca ccg act tat ccc ctt cct ggt aaa tca
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	_	Tyr	_			_		-	_		_	_				241
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Tyr	Ser 15	Cys	Ile	Glu	Asn	Ile 20	Asn	Asp	Ser	His	Cys 25	Asn	Glu	Glu	Cys	
Ile 30	Ser	Ser	Ile	Arg	Lys 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Lys	Phe	Tyr 45	
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Lys Tyr Gly Cys Val Met Leu Val Gly Asp Ser Gly Cys Asp Thr Glu
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Cys Lys Ala Lys Asn Gln Gly Gly Lys Lys Gly Trp Cys Tyr Ala Phe
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ggg tgc tgg tgc aca ggt atg ccc gac agt aca cag gtt tat ccc ctt
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cct gat aaa tca tgc ggc aaa aaa taatggcaac gtctttttat tgtccaccaa
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tgc as Cys Ly 30	s Ala														193
gca to Ala Cy 45		_	_		_		_	_		_					241
cct as Pro As			_				taat	agca	aac a	aactt	ttt	at to	gtcca	accaa	295
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Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys Lys Ala Lys
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Tyr Gly	/ Cys	Leu	Lys	Leu	Gly 20	Glu	Asn	Glu	Gly	Cys 25	Asp	Lys	Glu	Cys	
Lys Ala	a Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Ala 45	
Cys Tr	) Cys	Glu	Gly 50	Leu	Pro	Glu	Ser	Thr 55	Pro	Thr	Tyr	Pro	Leu 60	Pro	
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Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
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Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
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gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt cct aat aaa tca
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Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
aaa tac gat tgc ttt tgg ttg gga aaa aac gaa cac tgc gat acg gaa
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Lys Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Thr Glu
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gca tg Ala Cy 45															241
cct aa Pro As							taat	cagca	aac a	aacti	ttt	at to	gtcca	accaa	295
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Lys Al 30	a Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	Tyr	Ala	Phe	Ala 45	
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aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc
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gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca
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                                         -10
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                                                                      97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
            -1 1
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Lys Tyr Asp Cys Phe Trp Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
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                                                                      96
Phe Trp Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
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aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc
                                                                     144
Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
        35
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Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
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aaa tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa
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Lys Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
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		tgg Trp														241
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Tyr	Gly 15	Cys	Leu	Lys	Leu	Gly 20	Glu	Asn	Glu	Gly	Сув 25	Asp	Lys	Glu	Cys	
30 TÀa	Ala	Lys	Asn	Gln	Gly 35	Gly	Ser	Tyr	Gly	Tyr 40	Cys	туr	Ala	Phe	Ala 45	
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Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
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                                25
aac caa gga ggt agt tac ggc tat tgc tac gct ttc gca tgc tgg tgc
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Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
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                                         -10
                                                             -5
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Thr Val Leu Ala Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys
            -1 1
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Thr Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn
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tgc aag aat gaa gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc
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Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Asn Glu
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Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly
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ttg ccc gga att aca ccg att tca cgt act cct ggt aaa aca tgt aaa
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Ile
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Thr Val Leu Ala Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys
aca ctc gaa tgc ata gac atg aca gga gac aaa aat tgc gat agg aat
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                            20
tgc aag aag gaa gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc
                                                                      193
Cys Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys
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<400> 183
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gag gat ggt tat ttg ttt gac aag aga aag cgc tgc aca ctc gaa tgc
Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr Leu Glu Cys
ata gac atg aca gga gac aaa aat tgc gat agg aat tgc aag aag gaa
                                                                      96
Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Lys Glu
gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc tgg tgc aaa gga
                                                                     144
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly
        35
ttg ccc gga att aca ccg att tca cgt act cct ggt aaa aca tgt aaa
                                                                     192
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys
ata
                                                                     195
Ile
65
<210> 184
<211> 65
<212> PRT
<213> Centruroides sculpturatus
<400> 184
Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr Leu Glu Cys
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Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Lys Glu
            20
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly
        35
                            40
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys
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Ile
65
<210> 185
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<211> 314

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<213> Centruroides sculpturatus
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<222>
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<222> (2)..(256)
<223> Product= Sodium channel modifier toxin precursor
       In the mature peptide, the last Cys is amidated, and the last Gly
       and the last 2 basic aminoacids are cut
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<301> Corona, M., Valdez Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus
Ewing, that recognize Na+ channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
<313> (5)..(256)
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g atg aac teg ttg ttg atg atc act get tgt ttg gte eta tte gga aca
                                                                       49
  Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
                                      -10
gtc tgg tca gag aaa ggt tat ctg gtg cat gag gac acg ggc tgc aga
                                                                       97
Val Trp Ser Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg
tac aag tgc act ttt tcg gga gaa aat agt tac tgc gat aag gaa tgc
                                                                      145
Tyr Lys Cys Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys
aag agc caa gga ggt gat tot ggc att tgc caa tot aag gcg tgt tat
                                                                      193
Lys Ser Gln Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr
```

35 40 45 30 tgc caa ggt ttg ccc gaa gat aca aag act tgg ccc ctt att ggt aaa 241 Cys Gln Gly Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys tta tgc ggc aga aaa taatggcttc gtctttttat tgttcaccaa caaaaatagt 296 Leu Cys Gly Arg Lys gtaacgcttc ttaatttc 314 <210> 186 <211> 85 <212> PRT <213> Centruroides sculpturatus <400> 186 Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr -10 Val Trp Ser Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg -1 1 Tyr Lys Cys Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys Lys Ser Gln Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr 35 Cys Gln Gly Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys 55 Leu Cys Gly Arg Lys 65 <210> 187 <211> 189 <212> DNA <213> Centruroides sculpturatus <220> <221> CDS <222> (1)..(189) <223> Product= Sodium channel modifier toxin <300> <301> Corona, M., Valdez Cruz, N.A., Merino, E., Zurita, M. & Possani L.D. <302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing, that recognize Na+ channels

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<304> 39
<305> 12
<306> 1893-1898
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<309>
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                                                                      48
Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg Tyr Lys Cys
act ttt tcg gga gaa aat agt tac tgc gat aag gaa tgc aag agc caa
                                                                      96
Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys Lys Ser Gln
            20
gga ggt gat tot ggc att tgc caa tot aag gcg tgt tat tgc caa ggt
                                                                     144
Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr Cys Gln Gly
        35
ttg ccc gaa gat aca aag act tgg ccc ctt att ggt aaa tta tgc
                                                                     189
Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys Leu Cys
<210> 188
<211> 63
<212> PRT
<213> Centruroides sculpturatus
<400> 188
Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg Tyr Lys Cys
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Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys Lys Ser Gln
            20
                                25
Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr Cys Gln Gly
        35
Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys Leu Cys
    50
                        55
<210> 189
<211>
      321
<212> DNA
<213> Centruroides sculpturatus
<220>
<221>
      CDS
<222>
      (5)..(265)
<223> Product= Sodium channel modifier toxin precursor
       In the mature peptide, the last Asn is amidated, and the last Gly
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and the last basic aminoacid are cut

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<220>
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<222> (269)..(321)
<223> 3'UTR
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<222> (1)..(4)
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<221> mat peptide
<222> (62)..()
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<301> Corona, M., Valdez Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus
Ewing, that recognize Na+ channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
<313> (5)..(265)
<400> 189
gaag atg aac tcg ttg ttg atc atc gct gct tgt ttg gcc ctg atc gga
                                                                      49
     Met Asn Ser Leu Leu Ile Ile Ala Ala Cys Leu Ala Leu Ile Gly
                     -15
                                         -10
aca gtc tgg gca aag gaa ggt tat att gtg aac tat cac acg ggc tgc
                                                                      97
Thr Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys
aaa tac gaa tgc ttt aaa ttg gga gac aac gat tat tgc ctg agg gaa
                                                                     145
Lys Tyr Glu Cys Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
                            20
tgc aaa ttg aga cac gga aaa ggt agt ggc ggc tat tgc tac gct ttt
                                                                     193
Cys Lys Leu Arg His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe
                        35
ggg tgc tgg tgc aca cac ttg tac gaa caa gca gtg gtt tgg ccc ctt
                                                                     241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
                    50
cct aag aaa aaa tgc aac gga aaa taatggcaac gactttttat tgtccaccaa
                                                                     295
Pro Lys Lys Cys Asn Gly Lys
```

<313> (1)..(198)

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cagaaatagt gtaacgcttc ttaatt
                                                                           321
<210> 190
<211> 87
<212> PRT
<213> Centruroides sculpturatus
<400> 190
Met Asn Ser Leu Leu Ile Ile Ala Ala Cys Leu Ala Leu Ile Gly Thr
                 -15
                                       -10
                                                             -5
Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys
        -1 1
                              5
Tyr Glu Cys Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys
                          20
                                                25
Lys Leu Arg His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly
                     35
                                           40
Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro
Lys Lys Cys Asn Gly Lys
             65
<210> 191
<211> 198
<212> DNA
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<301> Corona, M., Valdez Cruz, N.A., Merino, E., Zurita, M. & Possani L.D. <302> Genes and peptides from the scorpion Centruroides sculpturatus
Ewing, that recognize Na+ channels
<303> Toxicon
<304> 39
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<306> 1893-1898
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aag gaa ggt tat att gtg aac tat cac acg ggc tgc aaa tac gaa tgc
                                                                      48
Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys Tyr Glu Cys
                                    10
ttt aaa ttg gga gac aac gat tat tgc ctg agg gaa tgc aaa ttg aga
                                                                      96
Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg
            20
cac gga aaa ggt agt ggc ggc tat tgc tac gct ttt ggg tgc tgg tgc
                                                                      144
His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
aca cac ttg tac gaa caa gca gtg gtt tgg ccc ctt cct aag aaa aaa
                                                                      192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Lys
tgc aac
                                                                      198
Cys Asn
65
<210> 192
<211> 66
<212> PRT
<213> Centruroides sculpturatus
<400> 192
Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys Tyr Glu Cys
Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg
            20
His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
        35
                            40
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Lys
    50
Cys Asn
<210> 193
<211>
       320
<212> DNA
<213> Centruroides sculpturatus
<220>
<221>
      CDS
<222>
       (5)..(262)
       Product = Sodium channel modifier toxin precursor
       In the mature peptide, the last Cys is amidated, and the last Gly
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## and the last 2 basic aminoacids are cut

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<222> (266)..(320)
<223> 5'clip
<220>
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<222> (1)..(4)
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<301> Corona, M., Valdez Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus
Ewing, that recognize Na+ channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
<313> (5)..(262)
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gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc gtg atc gga
                                                                       49
     Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Val Ile Gly
                     -15
                                         -10
aca gtg tgg gca aag gaa ggt tat ctg gtg gac gta aag ggc tgc aaa
                                                                       97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys
aaa aat tgc tgg aaa ttg gga gat aac gat tat tgc aat agg gaa tgt
                                                                      145
Lys Asn Cys Trp Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys
aaa tgg aag cac ata gga ggt agt tac ggc tat tgc tac gga ttt ggg
                                                                      193
Lys Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly
                        35
tgc tat tgc gaa gga ttg ccc gat agt aca cag act tgg ccc ctt cct
                                                                      241
Cys Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro
aat aaa aca tgc ggc aaa aaa taatggcaac gactttttat tgtctaccaa
                                                                      292
Asn Lys Thr Cys Gly Lys Lys
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<313> (1)..(192)

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320
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<211> 86
<212> PRT
<213> Centruroides sculpturatus
<400> 194
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                                      -10
Val Trp Ala Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys Lys
                          5
        -1 1
Asn Cys Trp Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys
  15
                          20
Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys
Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn
                 50
                                       55
Lys Thr Cys Gly Lys Lys
           65
<210> 195
<211> 192
<212> DNA
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Ewing, that recognize Na+ channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
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                                                                       48
aag gaa ggt tat ctg gtg gac gta aag ggc tgc aaa aaa aat tgc tgg
Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys Lys Asn Cys Trp
                5
                                    10
aaa ttg gga gat aac gat tat tgc aat agg gaa tgt aaa tgg aag cac
                                                                       96
Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys Trp Lys His
ata gga ggt agt tac ggc tat tgc tac gga ttt ggg tgc tat tgc gaa
                                                                      144
Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
                                                                      192
gga ttg ccc gat agt aca cag act tgg ccc ctt cct aat aaa aca tgc
Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
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       196
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       64
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      PRT
<213> Centruroides sculpturatus
<400> 196
Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys Lys Asn Cys Trp
Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys Trp Lys His
            20
Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
                            40
        35
Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
                        55
    50
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<211>
       190
<212>
       DNA
<213> Centruroides exilicauda
<220>
<221> CDS
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       (1)..(129)
<223> Product= Erg channel modifier toxin precursor
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       (130)..(190)
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Asp 1	Arg	Asp	Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Cys	Ala	Lys	Tyr	Gly 15	Tyr	
		gag Glu														96
		atg Met 35								taa	acto	gaaa	at o	cagtt	aataa	149
tato	caaaç	gtt <u>c</u>	taag	ctat	t ta	itgaa	ıgtga	a aaa	ataa	aga	t					190
<210 <211 <212 <213	L> 4 2> I	198 12 PRT Centr	ruroi	.des	exil	licau	ıda									
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Asp 1	Arg	Asp	Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Cys	Ala	Lys	Tyr	Gly 15	Tyr	
Tyr	Gln	Glu	Cys 20	Gln	Asp	Cys	Cys	Lys 25	Lys	Ala	Gly	His	Ser 30	Gly	Gly	
Thr	Cys	Met 35	Phe	Phe	Lys	Cys	Lys 40	Cys	Ala							
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gat		199 gat Asp														48
		gag Glu	_	_	_	_	_	_		_			-	_		96
	_	atg Met 35			_	_		_								126

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Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Ser Gly Gly
            20
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Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
<210> 201
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<223> Product= Erg channel modifier toxin precursor
<220>
<221> 3'UTR
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<223> 3'UTR
<400> 201
                                                                      48
gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
                                    10
tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
atc tgc gag tat tac aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
qaattaagaa tatcaaagct ggaagctgtt taaaaagtga aaaataaaga ttatt
                                                                     197
<210> 202
<211>
      43
<212> PRT
<213> Centruroides exilicauda
<400> 202
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly

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20
                                25
                                                    30
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
<210> 203
<211> 129
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<222> (1)..(129)
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
                                    10
tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Ala Gly Asp Arg Ala Gly
            20
                                25
                                                                     129
atc tgc gag tat tac aag tgt aaa tgt aac cca
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
        35
<210> 204
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      43
<212>
      PRT
<213> Centruroides exilicauda
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Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
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tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
acc tgc gag tat ttc aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
                            40
gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttat
                                                                     196
<210> 206
<211> 43
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<213> Centruroides exilicauda
<400> 206
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
<210> 207
<211> 129
<212> DNA
<213> Centruroides exilicauda
<220>
<221> CDS
      (1)..(129)
<222>
<223> Product= Erg channel modifier toxin
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Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1
                5
                                    10
tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
acc tgc gag tat ttc aag tgt aaa tgt aac cca
                                                                     129
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
<210>
      208
      43
<211>
<212> PRT
<213> Centruroides exilicauda
<400> 208
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
                                    10
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
<210> 209
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
                                    10
tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
acc tgc gag tat ttc aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
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gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttag
                                                               196
<210> 210
<211> 43
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Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
                                    10
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
                                25
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
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                                                                     48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                     96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
acc tgc gag tat ttc aag tgt aaa tgt aac cca
                                                                     129
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
        35
<210> 212
<211> 43
<212> PRT
<213> Centruroides exilicauda
<400> 212
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
                5
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Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 25

20

Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro 40 <210> 213 <211> 202 <212> DNA Centruroides limpidus limpidus <220> <221> CDS <222> (1)..(129) <223> Product= Erg channel modifier toxin precursor <220> <221> 3'UTR <222> (130)..(202) <223> 3'UTR <400> 213 gat aga gat agc tgt gtt gat aaa tca cga tgc tca aaa tat gga tac 48 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr tac caa gag tgt cag gat tgt tgc aag aaa gct gga cac aat gga gga 96 Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly 20 acc tgc atg ttt ttc aag tgt aaa tgt gcg taa actcgaagat gaattaacaa 149 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala tatcaaagct gtaatctatt tatgaagtaa aaaataaagt ttttgaaatt tcc 202 214 <210> <211> 42 <212> PRT <213> Centruroides limpidus limpidus <400> 214 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr 5 10 15 Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly 20 25

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala

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Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr
tac caa gag tgt cag gat tgt tgc aag aaa gct gga cac aat gga gga
                                                                       96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
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                                                                      126
acc tgc atg ttt ttc aag tgt aaa tgt gcg
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
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Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
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Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
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aac tgc gtg tat ttc aag tgt aaa tgt aac cca taa actcgaatgt Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro 35 40	142								
gaattaagaa tatcaaagct ggaagctatt taagaagtga aaaataaaga ttattaaatt									
teege	207								
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30									
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro 35 40									
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1 5 10 15									
tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30	96								
aac tgc gtg tat ttc aag tgt aaa tgt aac cca	129								

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Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro
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tat ggt caa tgt gat aag tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
aac tgc gtg tat ttc aag tgt aaa tgt aac caa taa actcgaatgt
                                                                      142
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
                                                                      202
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taagaga
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Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
tat ggt caa tgt gat aag tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
aac tgc gtg tat ttc aag tgt aaa tgt aac caa
                                                                     129
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
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<211> 43
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<213> Centruroides limpidus limpidus
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Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
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Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln

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Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
                                    10
tat ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
aac tgc gtg tat tta aag tgt aaa tgt aac caa taa actcgaatg
                                                                     141
Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
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<213> Centruroides limpidus limpidus
<400> 226
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
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                                    10
tat ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
                                                                     129
aac tgc gtg tat tta aag tgt aaa tgt aac caa
Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
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       228
<211>
       43
<212> PRT
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
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Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
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<212> DNA
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                                                                       48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
                                                                       96
tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 25 30 20 acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142 Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataagat tattaaattt 202 244 <210> 230 <211> 43 <212> PRT <213> Centruroides noxius <400> 230 Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr 10 Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro 40 <210> 231 <211> 129 <212> DNA <213> Centruroides noxius <220> <221> CDS <222> (1)..(129) <223> Product= Erg channel modifier toxin <400> 231 gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48 Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96 Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly acc tgc gtg tat tac aag tgt aaa tgt aac cca 129 Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro <210> 232

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                                25
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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<212> DNA
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
                                    10
tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gaa cgt gta gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
            20
acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
                            40
gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttattaaatt
                                                                     202
                                                                     212
tccgcaaatt
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      43
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<400> 234
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
            20
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Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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                                                                       48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
tac qqt caa tqt qat qaq tqt tgc aag aaa gct gga gaa cgt gta gga
                                                                       96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
            20
acc tgc gtg tat tac aag tgt aaa tgt aac cca
                                                                      129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210> 236
<211> 43
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<400> 236
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Tyr Gly Gln Cys Asp Glu Cys Cys Lys Ala Gly Glu Arg Val Gly
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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<212>

DNA

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Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
tac caa gag tgt cag gat tgt tgc aag aat gct gga cac aat gga gga
                                                                      96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
                                25
acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
                            40
gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttattaaatt
                                                                     202
tccgcaaatt
                                                                     212
<210> 238
<211> 43
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<213> Centruroides noxius
<400> 238
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Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
            2.0
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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<222>
      (1)..(129)
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                                    10
tac caa gag tgt cag gat tgt tgc aag aat gct gga cac aat gga gga
                                                                       96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
acc tgc gtg tat tac aag tgt aaa tgt aac cca
                                                                      129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210>
       240
<211>
       43
<212>
      PRT
<213> Centruroides noxius
<400> 240
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Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
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       241
<211>
      194
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       (1)..(129)
      Product = Erg channel modifier toxin precursor
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<220>
<221>
      3'UTR
<222>
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       3'UTR
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                                                                       48
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                                                                       96
tac caa gag tgt aca gat tgt tgc aag aaa tat gga cac aat ggg gga
Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
            20
acc tgc atg ttt ttc aag tgt aaa tgt gcg taa actcgaagat aaattaataa
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Thr Cys Met Phe Phe Lys Cys Lys Cys Ala 35 40 194 tatcaaagct gtaagctatt tatgaagtga aaaataaaga ttatg <210> 242 <211> 42 <212> PRT <213> Centruroides elegans <400> 242 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly Thr Cys Met Phe Phe Lys Cys Lys Cys Ala <210> 243 <211> 126 <212> DNA <213> Centruroides elegans <220> <221> CDS <222> (1)..(126) <223> Product= Erg channel modifier toxin <400> 243 48 gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr 10 tac caa gag tgt aca gat tgt tgc aag aaa tat gga cac aat ggg gga 96 Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly 126 acc tgc atg ttt ttc aag tgt aaa tgt gcg Thr Cys Met Phe Phe Lys Cys Lys Cys Ala <210> 244 <211> 42 <212> PRT <213> Centruroides elegans <400> 244 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr

Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly

20 25 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala <210> 245 <211> 197 <212> DNA <213> Centruroides elegans <220> <221> CDS <222> (1)..(132) <223> Product= Erg channel modifier toxin precursor <220> <221> 3'UTR <222> (133)..(197) <223> 3'UTR <400> 245 48 gat aga gat agc tgt gtt gat aaa tca aga tgc gca aaa tat gga tac Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr 10 tac caa cag tgt gaa att tgt tgc aag aaa gct gga cac aga gga gga 96 Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly 20 142 acc tgc gaa ttt ttc aag tgt aaa tgt aaa gta taa actcgaatgt Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val gaattaagaa tatcaaagct gggaactgtt tacgatgtga aaaataaaga ttatt 197 <210> 246 <211> 43 PRT <213> Centruroides elegans <400> 246 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr 5 Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly 20

Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val

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<213> Centruroides elegans
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                                                                       48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
                                                                       96
tac caa cag tgt gaa att tgt tgc aag aaa gct gga cac aga gga gga
Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
            20
                                                                      129
acc tgc gaa ttt ttc aag tgt aaa tgt aaa gta
Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
                            40
<210> 248
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<213> Centruroides elegans
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Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
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tat cat caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30	96										
aac tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro 35 40	142										
gaattaagaa tatgaaagat ggaagctgtt taagaagtga aaaataaaga ttat											
<210> 250 <211> 43 <212> PRT <213> Centruroides elegans											
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Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30											
Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro 35 40											
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tat cat caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30	96										
aac tgc gtg tat tac aag tgt aaa tgt aac cca	129										

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Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210>
      252
<211> 43
<212> PRT
<213> Centruroides elegans
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Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210> 253
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      (1)..(129)
     Product = Erg channel modifier toxin precursor
<220>
      3 'UTR
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tac caa gag tgt acg gat tgt tgc aag aaa tac gga cac aat gga gga
                                                                      96
Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
            20
                                25
acc tgc atg ttc ttc aag tgt aaa tgt gcg taa actcgaagat gaattaataa
                                                                     149
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
        35
                                                                     193
tataaaagct gtaagctatt tacgaagtga aaaataaaga ttat
<210> 254
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      42
<212> PRT
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<213> Centruroides gracilis

<400> 254

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Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
                                25
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
<210> 255
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<223> Product= Erg channel modifier toxin
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly His
tac caa gag tgt acg gat tgt tgc aag aaa tac gga cac aat gga gga
                                                                     96
Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
            20
acc tgc atg ttc ttc aag tgt aaa tgt gcg
                                                                     126
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
        35
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<400> 256
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Thr Cys Met Phe Phe Lys Cys Lys Cys Ala

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<223> 3'UTR
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                                                                     48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
                                                                     96
tac gct cag tgt acg gcc tgt tgc aag aag gct gga cac aat aaa gga
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Lys Ala Gly His Asn Lys Gly
            20
acc tgc gac ttt ttc aag tgt aaa tgt acg taa tctcgaagaa gaattaatta
                                                                     149
Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
        35
                                                                     193
tatcaaaqct tqqaaccaat taccgaagtg gaaaaattaa gaat
<210> 258
<211> 42
<212> PRT
<213> Centruroides gracilis
<400> 258
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Ala Gly His Asn Lys Gly
            20
                                25
Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
        35
<210> 259
<211>
      126
<212> DNA
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<220>
<221> CDS
<222> (1)..(126)
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## <223> Product= Erg channel modifier toxin

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<400> 259
gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga aac
                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
tac gct cag tgt acg gcc tgt tgc aag aag gct gga cac aat aaa gga
                                                                      96
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Lys Ala Gly His Asn Lys Gly
acc tgc gac ttt ttc aag tgt aaa tgt acg
                                                                     126
Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
        35
<210> 260
<211> 42
<212> PRT
<213> Centruroides gracilis
<400> 260
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Lys Ala Gly His Asn Lys Gly
Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
        35
<210> 261
<211> 197
<212> DNA
<213> Centruroides gracilis
<220>
<221> CDS
      (1)..(141)
<222>
       Product= Erg channel modifier toxin precursor
<223>
       In the mature peptide, the last Ser is amidated, and the last Gly
        and the last basic aminoacid are cut
<220>
<221>
       3'UTR
<222>
       (142)..(197)
<223> 3'UTR
gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga ccc
                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
                                    10
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tac gga ca Tyr Gly Gl														96
acc tgc at Thr Cys II	e Tyr													141
tgaatttata	ataa	aag a	attat	t	197									
<210> 262 <211> 47 <212> PRT <213> Cer		ides	grad	cilis										
<400> 262														
Asp Arg As	p Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Сув	Gln	Lys	Tyr	Gly 15	Pro	
Tyr Gly Gl	n Cys 20	Thr	Asp	Cys	Cys	Lys 25	Lys	Ala	Gly	His	Thr 30	Gly	Gly	
Thr Cys II	_	Phe	Lys	Cys	Lys 40	Cys	Gly	Ala	Glu	Ser 45	Gly	Arg		
<210> 263 <211> 135 <212> DNA <213> Cer		ides	gra	cili	5									
	(13 oduct=		chai	nnel	mod	ifie	r to:	ĸin						
<400> 263														
gat aga ga Asp Arg As 1														48
tac gga ca Tyr Gly G														96
acc tgc at Thr Cys I:	e Tyr		_	_		_		_	_	_				135
<210> 264 <211> 45 <212> PR <213> Cer		ides	gra	cili	s									

<400> 264

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Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
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Thr Cys Ile Tyr Phe Lys Cys Lys Cys Gly Ala Glu Ser
<210> 265
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<212> DNA
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     Product= Erg channel modifier toxin precursor
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
tac caa gag tgt cag gat tgt tgc aag aaa gct gga cat aat gga gga
                                                                      96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
            20
acc tgt atg ttt ttc aag tgt aaa tgt gcg taa actcgaagat gaattaataa
                                                                     149
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
        35
tatcaaagct gtaagctatt tatgaagtga aaaataaaga ttatt
                                                                     194
<210>
      266
<211>
       42
<212>
       PRT
<213> Centruroides sculpturatus
<400> 266
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
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Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly

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30 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala 40 <210> 267 <211> 126 <212> DNA <213> Centruroides sculpturatus <220> <221> CDS <222> (1)..(126) <223> Product= Erg channel modifier toxin <400> 267 gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr tac caa gag tgt cag gat tgt tgc aag aaa gct gga cat aat gga gga 96 Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly 20 acc tgt atg ttt ttc aag tgt aaa tgt gcg 126 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala 35 <210> 268 <211> 42 <212> PRT <213> Centruroides sculpturatus <400> 268 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Ala Gly His Asn Gly Gly

20 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala <210> 269 <211> 197 <212> DNA <213> Centruroides sculpturatus <220> <221> CDS <222> (1)..(132)

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                                                                      96
tac ggt caa tgt gaa gtt tgt tgt aag aaa gct gga cat aga gga gga
Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Arg Gly Gly
            20
acc tgc gat ttt ttc aag tgt aaa tgt aaa gta taa actcgaatgt
                                                                     142
Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
        35
gaattaagaa tatcaaagct gggaactgtt tacgaagtga aaaataaaga ttttg
                                                                     197
<210> 270
<211> 43
<212> PRT
<213> Centruroides sculpturatus
<400> 270
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
                                    10
                                                        15
Tyr Gly Gln Cys Glu Val Cys Cys Lys Ala Gly His Arg Gly Gly
            20
Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
        35
<210> 271
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       129
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      DNA
<213> Centruroides sculpturatus
<220>
<221> CDS
<222>
      (1)..(129)
<223> Product= Erg channel modifier toxin
<400> 271
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac
                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
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tac ggt Tyr Gly															96
acc tgc Thr Cys															129
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<400> 272															
Asp Arg	Asp	Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Cys	Ala	Lys	Tyr	Gly 15	Tyr	
Tyr Gly	Gln	Суs 20	Glu	Val	Сув	Cys	Lys 25	Lys	Ala	Gly	His	Arg 30	Gly	Gly	
Thr Cys	Asp 35	Phe	Phe	Lys	Cys	Lys 40	Cys	Lys	Val						
<210><211><212><213>	273 197 DNA Cent:	ruro:	ides	scul	lptui	ratus	3								
<220> <221> <222> <223>	CDS (1). Prod			char	nnel	mod:	if <b>ie</b> :	r to	kin p	preci	ırso	r			
<220><221><222><222><223>	3'UT! (133) 3'UT!	) (:	197)												
<400> gat aga Asp Arg	_	_	_	_	_			_	_						48
tac ggt Tyr Gly															96
acc tgo Thr Cys				_	_		_			taa	act	cgaa	tgt		142
gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttatt												197			

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      274
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      43
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      PRT
<213> Centruroides sculpturatus
<400> 274
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Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
tac ggt caa tgt gat gac tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
                                25
                                                                     129
acc tgc gtg tat tac aag tgt aaa tgt aac cca
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210>
       276
<211>
       43
<212>
       PRT
      Centruroides sculpturatus
<400> 276
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
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Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
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<210>
      277
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
                                    10
tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
                                25
acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt
                                                                     142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
        35
                            40
gaattaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga tta
                                                                     195
      278
<210>
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      43
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<400> 278
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210> 279
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      129
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<222> (1)..(129)
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                                                                      48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga
                                                                      96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
                                25
            20
                                                                     129
acc tgc gtg tat tac aag tgt aaa tgt aac cca
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
<210> 280
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      43
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Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
            20
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
        35
                            40
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      CDS
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       (145)..(192)
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      3 'UTR
<400> 281
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac
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Asp 1	Arg	Asp	Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Cys	Ala	Lys	Tyr	Gly 15	Tyr	
		caa Gln	_	_	_	_	_	_		_						96
	_	atg Met 35			_	_	_	_	_		_	_	_		taa	144
taat	catca	aaa g	gctgt	aago	t at	ttat	gaag	g tga	aaaa	ıtaa	agat	tatt	;			192
<210 <211 <212 <213	1 > 4 2 > 1	282 47 PRT Centi	ruroi	ides	scul	.ptur	ratus	3		`						
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Asp 1	Arg	Asp	Ser	Cys 5	Val	Asp	Lys	Ser	Arg 10	Cys	Ala	Lys	Туr	Gly 15	Tyr	
Tyr	Gly	Gln	Cys 20	Glu	Val	Cys	Cys	Lys 25	Lys	Ala	Gly	His	Asn 30	Gly	Gly	
Thr	Cys	Met 35	Phe	Phe	Lys	Cys	Met 40	Сув	Val	Asn	Ser	Lys 45	Met	Asn		
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_	aga	283 gat Asp	_	_	_	-										4.8
		caa Gln	_	_	_	_	_	_		_						96
	_	atg Met 35			_	_	_	_	_		_	_	_			141

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<400> 284
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
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                5
                                   10
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Tyr Gly Gln Cys Glu Val Cys Cys Lys Ala Gly His Asn Gly Gly
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                                25
Thr Cys Met Phe Phe Lys Cys Met Cys Val Asn Ser Lys Met Asn
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<220>
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<223> oligonucleotite T22NN
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<400> 285
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<210> 286
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<212> DNA
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<220>
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<221> misc_feature <222> (24)..(24)
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<223> y is c or t
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<223> Oligonucleotide D1
<400> 286
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gcaattaaga agcgttacaa ta
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<223> b is c or g
<220>
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<220>

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<220>
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<223> m is a or c
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<212> DNA
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<221> primer_bind
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